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ABSTRACT

A model for transforming the role of the student has been developed based on principles of organizational theory, change management, and the research concerning implementation of computer and telecommunications technology in schools. This model, called "Expert Learning Communities," has been applied in the design and implementation of a preservice teacher education course, "Technology for Teachers," taught in the Instructional Psychology and Technology Department at Brigham Young University (Utah). The goal of the course is to provide specific instruction, tasks, and projects enabling preservice teachers to: practice the student role as researcher and communicator; observe course instructors as they model the teacher role in an expert learning community; and perform as junior teachers or experts working on projects of substance. The strategic plan followed in the course offers six key strategies for creating and maintaining an effective expert learning community: (1) commitment to improving the esprit, morale, and climate of the learning community; (2) using multiple improvement cycles; (3) representing the domains of expertise, called work models; (4) developing and following a multidisciplinary curriculum plan; (5) introducing new tools (computer setups that permit certain role shifts to occur); and (6) administration (roles, rules, and planning documents). Each of these elements of the strategic plan is illustrated with examples and graphics. (Contains seven references and five web site addresses.) (Author/ND)

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ED 406 342

Building an Expert Learning Community in a Preservice "Technology for Teachers" Course

by C. Victor Bunderson, Ph.D. and Margaret Martinez
October 3, 1996

Abstract: A model for transforming the role of the student has been developed based on principles of organizational theory, change management, and the research concerning implementation of computer and telecommunications technology in schools. The application of organizational theory to this process of school restructuring and change management is quite promising in the educational reform model called Expert Learning Communities. This model has been developed and used to guide research into how schools may be transformed, over a series of three to five improvement cycles. The Expert Learning Community model has also been applied in the design and implementation of a preservice teacher course, called IP&T 286 "Technology for Teachers," taught in the Instructional Psychology and Technology Department at Brigham Young University (BYU).

Should the conventional uses of computers, those that substitute for or incrementally improve elements of traditional practice, be taught in an introductory technology course for preservice teachers? Or rather, should universities take advantage of the opportunity afforded by the introduction of new computer and telecommunication tools to teach restructuring of student and educator roles? In a "Technology for Teachers" course at BYU, now in its third cycle of change (Fall semester, Oct 1996), a promising educational reform agenda has been adopted. In this course, the student teachers experience the new student role and discover what it is like to have greater responsibility for their own learning.

The goal of the "Technology for Teachers" course is three-fold: provide specific instruction, tasks, and projects enabling preservice teachers to (1) practice the student role as researcher and communicator; (2) observe course instructors as they model the teacher role (demonstrator, guide, and coach) in an expert learning community; and (3) perform as junior teachers or experts working on projects of substance.

From the beginning, a strategic plan has been followed for designing, developing, and implementing an Expert Learning Community (ELC) among the students and educators in the IP&T 286 course. This plan, implemented over several improvement cycles, offers six key strategies for creating and maintaining an effective Expert Learning Community:

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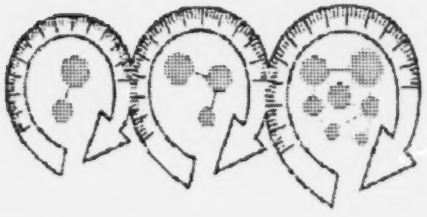
1 Esprit, morale, and climate of the learning community

The ELC fosters a unique camaraderie between students, teachers, and support staff. The members of the expertise-oriented community have common ideals and agree on how to treat one another as people and as professionals.

The Expert Learning Community

The ELC team shows unified commitment to improving (1) the roles of teachers and support staff as they focus on students achieving greater independence and expertise (as researchers/developers, communicators using new tools, and even as junior teachers); (2) the rules, tools, and environments of the organization; (3) the expertise of the educators, support, and each new group of students working systematically through a formative research process.

2 Multiple improvement cycles

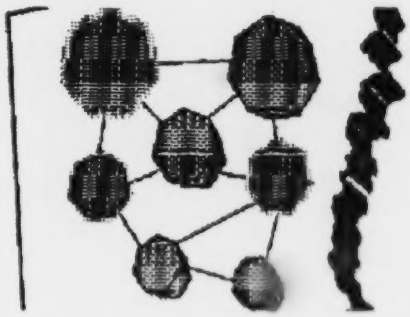


Cycles of Improvement

For implementing the ELC, the model uses a multicycle assessment and change process, called *improvement cycles.* Implementation typically requires three to five cycles. Implementation of the "Technology for Teachers" course spans four (cycles) semester terms. The ELC team makes changes based on data, experience, and interpretations of the current and previous cycles. Changes implemented are agreed upon before beginning each new cycle. The team values the virtue of patience and the benefits of multiple minds interpreting the cycles for improvement. They agree that expertise will evolve over several cycles and increasingly come into focus along with the means for achievement. Moreover, they agree that the improvement cycles will be used to transform the system to support the students, teachers, and support staff in their new roles.

3 Representation of the domains of expertise

Each ELC model has a set of domains that represents the expert performance and epitomizes what experts can do. Two primary domains of expertise are featured in the IP&T 286 ELC. The first domain includes the roles of the teachers and support staff in the schools who always need to keep evaluating and improving their expertise. The second domain of expertise includes the roles of the technology-using teacher. A two-dimensional map is developed for each domain. It depicts a single domain that appears similar to a map of a state. One could call it a "state of expert knowledge" and could populate it with representations of what experts in different parts of the state can do. The tasks shown within the domains may be complex ones that show expertise or they may be a sequence of increasingly complex tasks leading up to an advanced "state of expert knowledge."



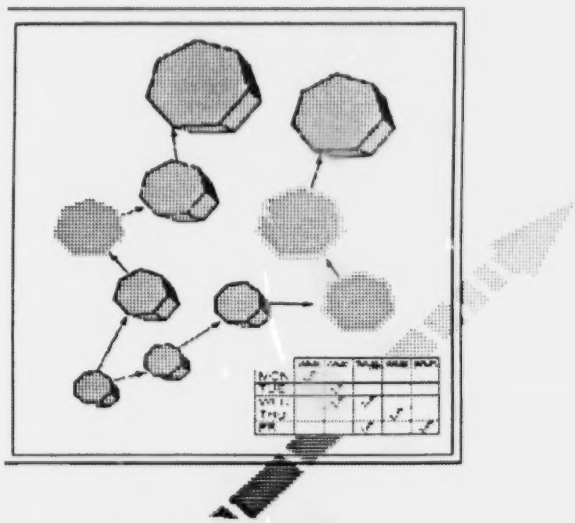
Domain of Expertise

These complex domain representations or tasks, which the ELC project team calls *work models*, capture and represent some of the values that give the expertise equity in the social realm and motivate the students to work towards expertise in an expert learning community.

4 Multidisciplinary curriculum plan

The multidisciplinary curriculum plan is a path and schedule, similar to an itinerary, through the tasks that populate the map of the "state of expert knowledge." The increasing size of the work models represent the increasing complexity of the expert knowledge. The work models build toward the ones at the top that most succinctly epitomize what experts know and keep doing to build their expertise continually. Those toward the bottom may be more conventional lessons or scaffolding tasks.

The fuzzy work models, shown in the illustration, represent the reality that designers do not always have a clear representation for their tasks. They must start somewhere and iterate based on experience.



EXPERTISE

It behooves the designers of the ELC to provide a sequence of increasingly complex work models that lead up to more complex ones. The introductory ones, like the short skis, short hills, and snowplow movement in the graduated-length method of skiing, assure early success for the novice learner during the first attempts. Despite the high probability of success, this initial skiing work model provides a complete minicycle of skiing. (You use balance and control to go up the hill, then, ski down and stop).

In the IP&T 286 curriculum plan, three work models (projects of substance that teachers might do on the job) are used. The first is to search the World Wide Web and locate example projects at schools where the student in other schools are given the role of (1) researcher/developer, (2) communicator using new tools, and (3) junior teacher. The second is to develop a newsletter, which includes two articles, a graph, and good visual design. One article summarizes the results of their research using the Web. The third project is to develop a short HTML document or hypermedia lesson. In the computer lab, lead-in experiences or lessons are given to prepare students for the larger projects. Portfolio exhibits of newsletters, telecommunication articles, and web pages using HTML now include excellent examples of growing expertise. These projects will change as new education technology appears in the classroom.

5 Tools; computer setups that permit (and require) certain role shifts to occur.

The introduction of new tools is an opportunity to restructure the roles of students and teachers and environment of the organization. Vendor advertisements typically describe instructional tools as separate units. Our students are taught that tools should be functional setups that support educational needs. Tools may be thought of as falling into four clusters: hardware setups, software titles, technology transfer tools, and measurement and improvement tools.

The first set of tools is a variety of typical clusters of hardware, system addons, classroom computers, and technology systems configured for well-defined educational functions. We call these functional groupings *setups*. Typical setups are: (1) technology for portable projection systems; (2) school computer labs; (3) gateways and software for Internet access; and (4) systems designed for school administrative functions.

The second set of tools includes packages we call "titles." This grouping includes software for student production of exhibits (e.g., "Works" packages), multimedia production software, and educational titles, such as CDROM and disk titles and similar software packages, that schools install on computers in labs or classrooms. These tools comprise what is normally thought of as the educational software marketplace.

The third set of tools is the class of tools for technology transfer. This class of tools, which correlates with the different setups, is largely missing from the current educational marketplace. These tools are a direct outgrowth of the research funded by the National Science Foundation at the BYU. The research uses the role delineation process (related to but

different from job analysis) as an essential specification step in producing designs, plans, and materials for masterful use of technology in individual study and project-centered education. This work is an ongoing attempt to describe the roles, rules, and organizational shifts that occur using transformational materials. The materials developed from these role delineation studies describe special ELC roles, such as the school computer lab manager, network librarian, visual literacy and communication developer, group technology teacher, and lab technology teacher. Technology transfer tools also include job descriptions, handbooks, training materials, inservice and preservice teacher seminars, and documentation about the new roles.

The fourth set of tools supports instrument measurement and management during the cyclical process for expert learning. This set includes databases and software tools for computerized testing, survey administration, and records management.

6 Administration: roles, rules, and planning documents

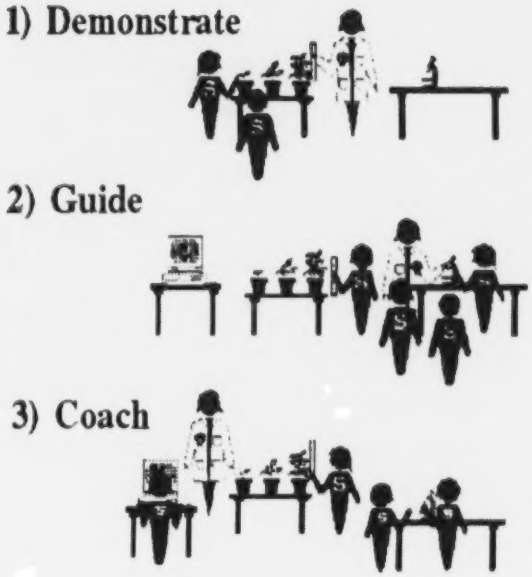
As different types of tools are introduced into an Expert Learning Community, the need for new roles and rules simultaneously increases. Technology transfer materials, which enable members of the ELC to master the new roles, are introduced. Likewise, it may also be necessary to change existing rules and policies that restrict change, such as those that do not authorize the hiring of different technical staff person, permit teachers to reorganize in teams, or utilize variable blocks of time larger than 50 minutes.

For example, when a local area network is introduced into a school to control a computer lab, three new roles are introduced: (1) the Network Engineer, to install, maintain, and troubleshoot the network; (2) the Computer Lab Manager, to manage the labs; and (3) the teacher, to guide or coach students working independently on projects of substance or reports. When a gateway to the Internet is introduced, the Network Administrator must gain new technical skills or an additional person must be made available within the school, from the district, or on call from a nearby company. In addition, someone at the school must acquire new technical skills and be given the task of Network or Multimedia Librarian to search the Internet, create home pages, control access to negative sites, and assist and teach other teachers and students about technology related activities.

The data collected during the first two changing cycles shows that the IP&T 286 students are not comfortable with the prospective role shifts. Many of them are much more comfortable with the controlling, managing role of the teacher in conventional classrooms. They are primarily concerned with how well they shall do as new teachers. As prospective teachers, they are also uncertain how they will enjoy the role of the teacher guide or coach supporting students working on projects of substance. The following explains the role shifts experienced by the student teachers.

A teacher in an ELC will often begin by performing aspects of the domain tasks to demonstrate expertise while the students observe. (Some projects are more open-ended and do not start with a demonstration). In the IP&T 286 course, teachers (1) demonstrate Internet searching; (2) use productivity software, such as wordprocessing, spreadsheets, draw and paint packages; and database software; (3) create web pages with an HTML editor; and (4) use hypermedia production software.

When teachers subscribe to ELC concepts, they not only demonstrate, but guide struggling students to greater levels of expertise. Student labs, staffed with assistants and aides, are necessary during this process. The projects-of-substance must be presented in stages at certain developmental levels to stay within the students' *zone of proximal development.* Teachers must (1) learn the size of step s that individual students can manage and (2) give the appropriate guidance.



Role Shifts

At some point, the students achieve the level necessary to perform the tasks independently as they work on projects and continue to enlarge their expertise. In this situation, the teacher and support staff now acts in the role of coach and observer. Clearly substantial role shifts and organizational and facility changes occur over the cycles presented in the strategic plan.

Summary

The purpose of the ELC model is to facilitate each individual in becoming a lifelong learner, a self-motivated researcher, a communicator of knowledge using new literacies, a technically competent user of technologies, and an effective team contributor. The value to both the teacher's and student's future is why we need to provide the opportunities for each of them to gain expertise in their new roles. Students and staff learning and working together in an expert learning community today are the inspired ones who can succeed as experts or professionals in tomorrow's rapidly-changing world.

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In the "Technology for Teachers" course, the different features of the Expert Learning Community concept and multicycle implementation plan are documented and rationalized through organizational theory and change management principles. The model provides a realistic framework for introducing technology into schools using current and future resources. The ELC research has also influenced other general education courses at BYU, such as *General Mathematics and Visual Literacy and Multimedia Design*

Additional Information

For additional information about the research, projects, courses, and materials mentioned in this paper, you can visit the following web sites.

Web Site Addresses:

Expert Learning Community	www.byu.edu/acd1/ed/elc/index.html
Instructional Psychology and Technology Dept.	www.byu.edu/acd1/ed/InSci/InSci.htmol
College of Education	www.byu.edu/acd1/ed.html
IP&T Computer Lab	www.byu.edu/acd1/ed/index.html
IP&T Tour of the Internet	www.byu.edu/acd1/ed/InSci/Projects/Judys Tour.html